

Water Cooling Extruders

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Vol. 16 #2, December 1989

The following is my reply to your request for a brief outline of the advantages and disadvantages of water cooling, for an extruder, and how to cover some of the disadvantages. — I'll be brief as you requested.

Advantages:

1. Provides maximum cooling available, maximum temperature difference available for driving force. (most barrels will allow cold water use, when needed)
2. Does not dump heat removed into extruder environment and add to room heat load.
3. Can be timed pulsed, for control.
4. Can later be modified for greater cooling via reduced fluid temperature.

Disadvantages:

1. Requires recirculation water system or zero solids once through water.
2. Can be difficult to control due to high heat flux available.
3. Can provide a safety problem, as a plug up can result in high pressure steam generation and unexpected release.

Discussion All of the disadvantages can be over come by installing a well designed system, which incorporates the following features.

The recirculating water cooling media, can be made up from plant steam condensate, or zero solids water can be purchased for initially charging the system. The feed lines, to each cooling zone should have a calibrated water flow limiting valve and a high pressure steam rupture disk properly vented. (With minimum water flow, cooling occurs by both sensible heat transfer as well as latent heat transfer, while at very high flow rates, the latent heat transfer can be prevented. Thus, without accurate control of the water rate, control will be difficult). The best control system provides time pulsing via a proper controller and a solenoid valve in the water cooling line to each zone. When the system is set up the instrument gain and water rate are both adjusted to obtain the control variation required under live operating conditions. Routine maintenance should be directed at chemical cleaning the barrel water flow passages, as slow buildup of water solids will occur if steam generation is allowed by the water flow.

— Frank Hoffman

See also:

- On/off barrel cooling control
- Optimization of cast aluminum barrel coolers
- Save money - monitor the little things
- Strand cooling

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